

CLAIMS

I claim:

1. A computing system comprising:

a first general purpose microprocessor having a first set of native instructions;

a first random access memory coupled to said first general purpose microprocessor;

a first virtual machine disposed in ROM, and executed by said first general purpose microprocessor;

a first predetermined subset of said first set of native instructions, wherein instructions in said first predetermined subset are likely to result in defects when executed;

a first virtual machine instruction subset, which includes said first set of native instructions, except for said first predetermined subset; said first virtual machine instruction subset is used by said first virtual machine; and,

said first virtual machine has received a certification by the FAA, in response to a written claim of an improved assurance level, based, at least in part, upon a reduction in contents of said first virtual machine instruction subset in relation to said first set of native instructions of said first microprocessor.

2. A system of claim 1 further comprising:

a first FAA certified avionics application running on said first virtual machine.
3. A system of claim 2 further comprising:

a second general purpose microprocessor which is dissimilar with respect to said first general purpose microprocessor;

a second virtual machine executed by said second general purpose microprocessor; and,

means for synchronizing and voting outputs of said first general purpose microprocessor and said second general purpose microprocessor.
4. A system of claim 3 wherein said second virtual machine executes said first FAA certified avionics application.

5. A system of claim 4 wherein said second virtual machine utilizes a second virtual machine instruction subset, and said second virtual machine has received a certification by the FAA, in response to a written claim of an improved assurance level, based, at least in part, upon testing of said second virtual machine instruction subset.

6. A system of claim 5 wherein said first and said second virtual machine are distinct compiled versions of an identical original virtual machine code.

7. A system of claim 6 wherein information is simultaneously provided to said first and said second general purpose microprocessors, via a single source of information.

8. A system of claim 7 wherein outputs of said first and second microprocessors have reduced temporal drift with respect to each other as a result of simultaneous receipt of information to be processed therein.

tem of claim 8 wherein said memory is a programmable logic device.

tem of claim 9 wherein said memory is a programmable logic device with

more than one compiled avionics

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11. A computing system comprising:

first means for processing a first native instruction set;

second means for processing a second native instruction set, wherein said second native instruction set is dissimilar with respect to said first native instruction set;

a first virtual machine operating on said first means for processing and generating first virtual machine outputs;

a second virtual machine operating on said second means for processing and generating second virtual machine outputs;

said first virtual machine and said second virtual machine being independently compiled applications originating from a single source application;

a first application being executed simultaneously by said first virtual machine and said second virtual machine; and

means for voting said first virtual machine outputs and said second virtual machine outputs to arrive at final outputs which have a higher assurance level, with respect to said first virtual machine outputs and said second virtual machine outputs when examined independently.

12. A system of claim 11 further comprising means for simultaneously providing information to be processed, to said first and said second virtual machines.

13. A system of claim 12 further comprising a shared memory which is not independently accessible from first means for processing and said second means for processing.

14. A system of claim 13 wherein said means for voting is disposed between said shared memory and said first and said second means for processing.

15. A system of claim 14 wherein said first means for processing is a first general purpose microprocessor.

16. A system of claim 15 wherein said first and said second virtual machines have been certified by an FAA official.

m of claim 16 wherein said first native instruction subsets which are
the instruction subsets which are
and said second native instruction subsets which are

m of claim 17 wherein a written instruction is received from a
said FAA official, where the written instruction is received
upon a reduction in content of a first native instruction subset
content of said first native instruction subset

18. A system of claim 17 wherein a written claim of higher assurance has been made to said FAA official, where the written claim has a component thereof which relies upon a reduction in content of one of said instruction subsets in comparison to a content of said first native instruction set.

19. A method of processing information comprising the steps of:

providing a first general purpose microprocessor, for use on an aircraft,
with a first virtual machine operating thereon;

providing a second general purpose microprocessor for use on an aircraft,
with a second virtual machine operating thereon;

making a written claim to an FAA official, claiming that said first virtual
machine operating on said first general purpose microprocessor results in an
increased assurance level;

running an avionics application on said first and said second virtual
machines and generating first and second outputs respectively;

voting said first and said second outputs to arrive at assurance enhanced
outputs;

making a claim to said FAA official that said assurance enhanced outputs
have a higher assurance level than said first outputs; and,

receiving a determination from said FAA official that said assurance
enhanced outputs exceed predetermined assurance criteria.

20. A method of claim 19 wherein said avionics application is a flight
management system application.